Chapter iv. we have a systematic account of the action of fluorine on the non-metallic elements and on some of their compounds, together with a somewhat detailed study of the non-metallic fluorides. The action of fluorine on the metals and their compounds forms the subject-matter of Chapter v., the organic fluorine compounds receiving treatment in Chapter vi. The last chapter in the book deals with the atomic weight of fluorine, the volumetric composition of hydrofluoric acid, the action of fluorine and hydrofluoric acid on glass, and the position of fluorine in the system of the elements. The author definitely places fluorine at the head of the halogen family, sufficient stress, however, being laid on the points in which fluorine resembles the elements of the oxygen family; such as the ease with which it unites with carbon, and the analogies exhibited by hydrofluoric acid to some dibasic acids. A short summary of the properties of fluorine concludes the volume, and for frontispiece there is an excellent portrait of the author.

The book is as interesting as a monograph can well be, and M. Moissan has earned the gratitude of all chemists by thus placing before them a connected record of one branch of his splendid activity. J. W.

OUR BOOK SHELF.

A Text-Book of Physical Chemistry. By Dr. R. A. Lehfeldt. Pp. xii+308. (London: Edward Arnold, 1899.)

A FEW years ago the teacher of physical chemistry seeking a suitable elementary text-book, dealing with the more recent developments of the subject, which he could put into the hands of a class of students approaching the study of physical chemistry for the first time, was somewhat embarrassed to find one. This state of things is now changed for the better by the recent appearance of several very excellent works; among these Dr. Lehfeldt's book will take a high place. The author explains in his preface that the book "is intended to contain what a student—with limited time and many subjects to learn—may usefully read. It is by no means written to suit any examination, but still is written with the practical requirements of students in view."

Dr. Lehfeldt has succeeded in avoiding the unessential and in explaining the fundamental ideas of modern physical chemistry in a thoroughly lucid manner, so that a student who has grasped the contents of this book will experience little difficulty in appreciating the meaning of the larger handbooks or original memoirs.

An introductory chapter on physical units will be useful to chemical students, who are, perhaps, apt to be slipshod in such matters. This is followed by a chapter on molecular weights in gases and solutions, which includes electrolytes and the ionic theory, and by a very well-considered chapter on the connection between physical properties and chemical constitution. The principles of thermodynamics are then explained; and the two laws (*a*) of chemical equilibrium in a system of perfect gases at constant temperature, and (*b*) of the influence of temperature on chemical equilibrium are deduced from them. This chapter presupposes some knowledge of the elements of the calculus, but any student who wishes to understand physical chemistry must make up his mind to acquire the small amount of mathematical knowledge requisite.

The applications of the two thermodynamic theorems to chemical change and equilibrium in homogeneous and heterogeneous systems are then taken up. This treatment has the great advantage that the whole of the phenomena can be grouped in a very simple way, the close relationship of chemical and physical change is clearly brought out, and the student is not bewildered by the apparent multiplicity of the phenomena. The book concludes with a brief but most interesting chapter on the theory of the galvanic cell, and the connection between electromotive force and chemical affinity. The book may be unhesitatingly recommended as one of the best of its kind.

The only misprint we have noticed occurs on p. 141, line 18, where "increases" is written in place of "decreases." T. E.

An Introduction to Analytical Chemistry. By G. G. Henderson, D.Sc., M.A., and M. A. Parker, B.Sc. Pp. 228. (London: Blackie and Son, Ltd., 1899.)

THIS is a compact work covering the ground of ordinary qualitative analysis as well as the tests for a number of organic substances, and also containing an account of the most important processes of quantitative analysis.

Without being designed on any new plan or being explanatory to the fullest extent, the book is written in a scientific spirit. The authors state that they have made free use of the works of Dittmar and others, and it is perhaps not uncomplimentary to remark that the influence of that sterling chemist is apparent in the book.

The directions for work are clear and practical, and the analytical methods quite satisfactory. Perhaps the least useful part of the book is that dealing with organic substances and their separation from mixtures. This branch of analytical art is very difficult, and the particular form of it, which has been encouraged by certain examining bodies, has brought disaster to many a good student. It is difficult to understand what useful purpose is served by the efforts of second-year students to prepare for recognising the constituents of, say, a mixture of urea and an inorganic salt. It is of no importance to medical men, it does not help the teaching of organic chemistry, and it crowds out practical work which would be of real value. The examination of such mixtures is a matter for an analyst of mature knowledge and experience. A. S.

Maryland Weather Service. Vol. i. Pp. 566. (Baltimore: The Johns Hopkins Press, 1899.)

THE Maryland State Weather Service was established in 1892, and its reports and climatic charts are favourably known to meteorologists. In 1896 a plan of closer co-operation between the National and State Weather Bureaux was proposed by Prof. W. L. Moore and adopted. This marked the commencement of a new and very important period in the history of the Service, and the present volume is the first published since the two organisations have been in close connection. The energies of the Service are now to be devoted chiefly to the publication of special reports on the climatology of the State, and if the volume before us is to be taken as an earnest of future ones, we may be pardoned a feeling of envy at the sumptuous way in which scientific work of this kind is presented to the public in America. We notice that it is proposed to publish in the near future a full account of the climatic features of Maryland, in which the physiography, meteorology, hydrography, medical climatology, agricultural soils, forestry, crop conditions and the fauna and flora of the State will be considered.

The present volume is confined to the physiography and meteorology, and includes an introduction by Prof.